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Iran's Gas Market after the Nuclear Deal (Characteristics and Opportunities)

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Abstract

Iran owns the first largest proven gas reserves in the world. Iran's energy wealth and geo-strategic location a bridge between East and West – allow it to export energy resources to European and Asian energy markets. However, due to various internal and international political, economic, and security constellations, Iran could not successfully exercise its energy potential internationally. The international agreement of July 2015, preconditioning lifting of sanctions and preparation of a new more competitive oil and gas contract framework in Iran signal a significant change in the international and domestic environment, allowing Iran to re-emerge in the global energy stage in a new atmosphere. Reopening Iran's energy sector will offer many new opportunities for the international oil companies. The big question is what are the Prospects and challenges for Iran's Gas Sector? The aim of this paper is to analyze the country's gas outlook in the aftermath of a potential nuclear deal, looking at the potential production trends, at the potential export options, but also at the political and commercial barriers that such a development will likely have to face. In fact, a full resolution of the nuclear issue will unlikely automatically change the Iranian gas market in the short term, as a number of commercial issues will continue to remain on the table.

Keywords: challenges, International gas market, Iran gas market, nuclear deal, positional, South Pars

JEL: G38, Q40

Introduction

Relations between Iran and the international community have undergone different phases from Teheran being a key partner of the West during the Shah era to being listed as one of the main adversaries of the United States (U.S.) after the 1979 Revolution. For decades, Western involvement in security issues in the Middle East has created a sense of threat for Iran, while Iran's controversial behaviour in the region has raised the international community's concerns. In this context, a persistent atmosphere of distrust between Iran and the West has been established. This was additionally aggravated by a sequence of historical events and processes that increased suspicions between Iran and the West.

During the last decade, due to the international community's security concerns about Iran's nontransparent Nuclear Program, the relations between Iran and the West have entered the most complicated and hostile phase to date. The international community's reaction included unilateral and multilateral sanctions imposed on Iran. Tightening of sanctions in 2012 placed Teheran in international isolation. One of the sanctions' specific focuses was to limit Iran's revenues from its energy sector. The international isolation severely affected Iran's oil and, to a lesser degree, gas industry. Sanctions' negative impact on Iran's economy and society, further aggravated by the severe drop in oil prices, brought Iran to the negotiating table. At the same time, President Hassan Rowhani's election and the new Iranian government objectives presented Tehran in a more positive light. As a consequence, after a series of negotiations, on July 14, 2015 a Joint Comprehensive Plan of Action (JCPOA) between Iran and the P5+1 (the UN Security Council 5permanent members: the U.S., the United Kingdom, France, Russia and China, plus Germany) negotiations were successful.

Reaching a permanent agreement marked a turning point in the relations between Iran and the international community (King's college London, 2015). This occurrence certainly represented just a first step toward a truly complete resolution of the Iranian nuclear issue, but it could be, seen as a positive sign for the future. If these recent developments will have a resolute follow up, great opportunities

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could open up in Iran, also with regard to natural gas sector (Tagliapiera, 2014).

Considering the world class size of the country's natural gas reserves, such a shift could well make Iran a real game-changer of international gas markets. In order to fully understand the first section of the paper, we will present reserves, natural gas field production and consumption. The second section of the paper will discuss gas exports now whereas the third section of the paper will finally present an outlook of Iran's natural gas market in the after math of the potential nuclear deal, discussing both the prospect for the domestic market and the various export opportunities, barriers to investment and massive potential.

Methodology

This is a descriptive-analytical research that, using available information, provides an economic assessment of the possibility of Iranian gas entering the global natural gas market after "Joint Comprehensive Plan of Action (JCPOA)", which was a long-term negotiations of the Iranian delegation with the 5 + 1 group in the framework of UN supervising on Iran's nuclear problem opening a new space towards Iran after UN Security Council hard sanctions against Iran for nearly a decade. The data used consist of mostly secondary data, including, electronic bulletins, books and articles published in newspapers and magazines as well as reliable economic websites and official statistics of the related organizations. Concepts, definitions and methods in the present study were widely taken from authentic academic books and scientific articles published in valid electronic library resources. Much of the relevant data pertaining to the statistical information derived from the Ministry of Oil of Iran, US-based Energy Information Administration (EIA), the International Energy Agency (IEA). The data has been collected from various sources such as, National Iranian Gas Company, research institutes, government offices, other secondary sources, including, internationally recognized economic and business journals. Those referring to the use of economic and political analysis published on web sites have also been helpful.

Reserves of Natural Gas Fields and Upstream Projects, Production, Consumption

Reserves

Iran has the world's largest proven natural gas reserves (Figure 1), (34 trillion cubic meters), 17% of the world's reserves and more than one-third of OPEC's reserves. Iran is the world's third largest natural gas producer, accounting for nearly 5% of the world's dry natural gas production in 2012 and its share is expected to increase. For 2013 gross gas production was 622.404 Mcm/d (21.98 Billion Cubic feet per day), gas re-injection—82.892 million cubic meters per day (2.892 Billion Cubic feet per day), gas flaring—45.193 Mcm/d (1.596 bcf/d), gas shrinkage and loss—58.870 Mcm/d (2.079 bcf/d) and marketed gas production—436.362 Mcm/d (15.41 bcf/d). Although the sanctions have affected the natural gas industry, the consequences are not as severe as the ones for the oil sector (Kalian, 2015).

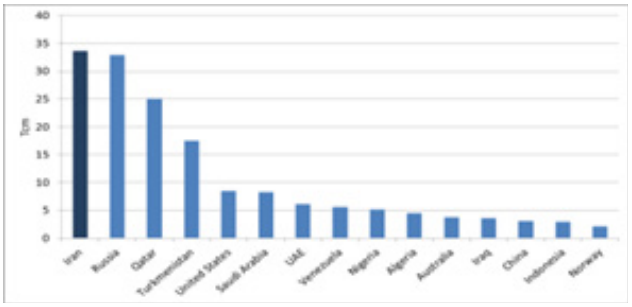

Figure 1. Major Proven Natural Gas Reserves in the World

Source: Own Elaboration on British Petroleum (2015).

Natural Gas Fields and Upstream Projects

Vast majority of Iran's gas is undeveloped. Iran's largest natural gas field, the South Pars, is estimated to hold roughly 40% of Iran's gross natural gas reserves. It accounted for 40% of the Iranian natural gas production in 2012. Significant associated natural gas production from the country's onshore oil fields (Tagliapietra, 2015).The major natural gas fields in the country are (see Figure 1, Map 1):

The South Pars (Pars-e Jonubi):

The giant **South Pars** field, shared with neighboring Qatar, is the world's and Iran's largest gas field, representing 47% of the country's gas reserves and accounting for 40%11 of gas production. The giant field's proven gas reserves are 40 trillion cubic meters, which amounts to 21% of the world's total gas reserves and a 50 million barrel condensate (Press TV, 16 April 2015). The share of South Pars field in the country's overall gas production will grow substantially once the 11 remaining phases of the field are fully developed and come online. According to Pars Oil & Gas Company, the estimated gas reserves of the Iranian portion of the field are 14 tcm and 18 billion barrel of gas condensate, which amounts to 7.5% of world gas reserves (Pars Oil & Gas Company, 21November 2015). In total, South Pars was designed to have a 30-phase development. Its aim is to produce around 790 mmcm/day, or approximately 271 bcm/year, of both natural gas and condensate.

Map.1. Iran's Major Natural Gas Fields

Source: EIA. Iran (2016).

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The Kish Field: Iran's Kish gas project located below the Kish Island in Persian Gulf with estimated recoverable gas reserves of 66tcf is the world's fifth biggest offshore gas project and the second biggest offshore gas field in Iran after South Pars. National Iranian Oil Company (NIOC) discovered the gas field in 2006. Petroleum Engineering and Development Company (PEDEC) has been developing the field in three phases since 2012.The first phase of the Kish gas project is expected to be operational in the first quarter of 2014 and is expected to produce 100 million cubic feet of gas a day (Offshore Technology, 2014). The field is expected to produce three billion cubic feet of gas and 30,000 barrels of gas condensates per day when fully operational.

The Lavan field's: Recoverable reserves are approximately 187 Bcm (6.6 Tcf) with 62 million barrels of condensate reserves. Its first phase is expected to be completed by 2015-2016, with production of 21.237 MMcm/d (750MMcf/d) of natural gas and 11,000 barrels of condensate.

The Farzad field's: Holds an estimated 613.909 Bcm (21.68 Tcf) of in-place reserves of which 5,946 MMcm (12.8Bcf) could be recovered. Oil and Natural Gas Corporation Videsh Ltd (OVL) operated the field until 2014 when due to delays Iran announced that it would put Farzad-B gas field on a list of fields it plans to auction (Mokul & Singh, 2015).

Gas Field	Production capacity MMcm/d	Expected Completition year
SP 12	80.00	2015/16
SP14	50.00	after 2020
SP 17	50.00	2015/16
SP 18		
SP 22	50.00	after 2020
SP 23		
SP 24		
Lavan	21.00	2015/2016
Ferdowsi	14.00	2017/18
Total increase of maximum	243 / 343	up to 2020
Total increase of more than	543	after 2025

Figure 2. Iranian Gas Fields' Production Capacity and Expected Competition Years

Source: European Centre for Energy and Resource Security (2016).

Production

Iran ranks as third natural gas production country in the world after the US and Russia but its production level remains far behind its potential in 2012 Iran produced 160 Bcm of natural gas, US and Russia produced 680 Bcm and 590 Bcm (EIA, 2013).

Gross natural gas production totaled almost 8.1 Tcf in 2013, 1% lower than the previous year's level. Iran's natural gas production increased in 2014, although estimates are still preliminary. Of the 8.1 Tcf produced, the most part was marketed (6.5 Tcf), and the remainder was re-injected into oil wells to enhance oil recovery (1.0 Tcf) or vented and flared (0.6 Tcf).

Re-injecting natural gas plays a critical role in oil recovery at Iran's fields. As a result, natural gas reinjection is expected to increase in the coming years. Some estimates indicate that NIOC will required between 2.0 and 2.5 Tcf per year of natural gas for reinjection into its oil fields in the next decade. Iran also flares (burns off) a substantial portion of its gross production. Iran became the world's largest gas-flaring country in 2013, surpassing Russia. Gas is flared because of the lack of infrastructure to capture and transport gas associated with oil production.

Dry natural gas production is a subset of marketed production. Marketed production includes dry natural gas, liquid hydrocarbons, and natural gas used in field and processing plant operations. In 2013, 80% of the gross natural gas production was marketed as dry gas. Iran's dry natural gas production has rapidly increased to almost 5.7 Tcf in 2013, almost double the amount produced 10 years ago. Iran is the world's third-largest dry natural gas producer after the United States and Russia. Most of Iran's production is consumed domestically. Domestic consumption has increased as production has increased, totaling almost 5.6 Tcf in2013 (U.S Energy Information Administration, 2015).

Much like in the oil sector, the natural gas sector has been hampered by international sanctions. Additionally, lack of foreign investment and insufficient financing have resulted in slow growth in Iran's natural gas production. However, development of its fields has been hampered by financing, technical, and contractual issues, according to the Arab Oil and Gas Journal. Nonetheless, Iran's natural gas production has grown, and output is likely to continue to increase in the coming years as new phases of the South Pars gas field come online.

Consumption

Iran's natural gas consumption is similar to its production. Although the country has significant volumes of gas production, high domestic consumption constitutes an obstacle before major natural gas exports. Iran imports natural gas due to seasonal gas supply problems. Natural gas consumption has a significant share in the domestic market. Gas consumption within the country is distributed as 34% for residential use, 28% for electricity generation, 25% for industrial

use, 5%for transportation, and 8% for other uses. Significant increase in natural gas production depends on the development of natural gas fields by making investments. At this point, it is important to lift the economic embargo and sanctions on Iran (Akhundzada & Ozkan, 2014).

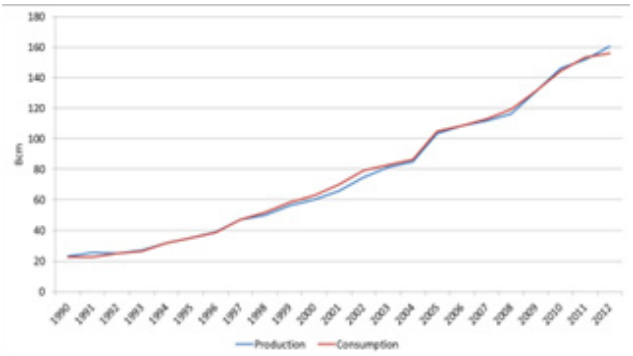

Figure 3. Iran's Natural Gas Production and Consumption (1990-2012)

Source: BP& Review of Environment Energy and Economics (2015).

Existing Export

Iran-Turkey Gas Export pipeline: Iran is Turkey's second supplier of gas after Russia, providing for one-fifth of the country's consumption. Azerbaijan is another supplier. Turkey says Iran's price is too high, charging $490 for every 1,000 cubic meters versus $335 and $425 by Azerbaijan and Russia, respectively. During April visit to Tehran by President Recep Tayyip Erdogan, Iran offered to double natural gas exports in return for a price cut which was turned down by Turkey. Turkey's state-owned Petroleum Pipeline Corporation (BOTAS) took the case to the court of international arbitration in 2012 for a ruling on the price. The case is still pending, with Ankara making a second effort for a ruling. Head of the international liaison office at the National Iranian Gas Company Ramezani stated: "The court of international arbitration's ruling is attentive to absolute rejection of BOTAS's claims and acceptance of the defense made by the National Iranian Gas Company and Iran is in fact the relative winner of the dispute.Despite the row, the Turks acknowledge Iran as a reliable source of energy, which could meet a substantial portion of Ankara's needs for natural gas. (Press TV, June 20 2015), Commercial ties between the two neighbors remain strong. Trade volume stood at $14 billion last year which the two countries plan to raise to $30 billion.

Iran – Armenia Gas Export Pipeline: The contract with Armenia was signed in 2004 and became operational in 2009. The Iranian section runs 140km to the Armenian border where it meets the 40km Armenian section stretching from the Meghri region to Sardarian. The Iran-Armenia pipeline was planned to be extended by a further 197km to take gas to the center of Armenia and link it up to the national distribution network. Although, it is uncertain whether this expansion will go ahead (Business Monitor, 2010). Tehran and Yerevan signed an official agreement for the export of Iran's gas to Armenia in 2004. Based on the agreement, Iran's natural gas is used by Armenian power plants to generate electricity and, in return, Armenia exports electricity to Iran (PressTV, 4 October 2015).

The Armenian section of the pipeline has been owned and operated by ArmRosGazprom (ARG) since 2006. Russian gas export monopoly Gazprom holds majority control of ARG with 80% of the company while the Armenian energy ministry owns the remaining 20%. Gazprom is the sole owner of the critical 40km section of the pipeline through Armenia (Business Monitor, 2010).

Iran–Azerbaijan Gas Export Pipeline: A 25-year swap deal between Azerbaijan and Iran was signed in 2005. It involved transporting an average of 300-390 mcm/y to the Azerbaijani enclave of Nakhchivan. Azerbaijan is committed to supplying an equal volume to the Iranian northern city of Astara through the Hajigabul-Astara pipeline, with a total capacity of 10 bcm/y. However, the pipeline is in dire need of overhaul in order to reach its full capacity (Abidi & Fesharaki, 2011). But, as with Armenia, volumes are very small. In 2011, Iran imported 0.39 bcm from Azerbaijan and exported 0.25bcm to Nakhchivan (Bp, 2012). Both countries have expressed interest in increasing natural gas trade. In 2010, Azeri SOCAR announced the construction of a new gas Pipeline from Sangachal to Astara with an annual capacity of 6.6bcm (Upstream, 2010). Iran declared its willingness both to import gas from Azerbaijan and to serve as a transit hub for Azeri gas exports in the Persian Gulf and the Gulf of Oman (Shana, 2010). However, taking Iran's regional pipeline, price and LNG export difficulties into account, these proposals have only remote chances of materializing. Indeed, there has been no news of concrete progress on the construction of the pipeline since the announcement in 2010. In the future, there could be a political and economic rationale for Azerbaijani-Iranian gas trade beyond the supply of Nakhchivan for which Iran is compensated with a 15% commission on transit fees, with a realistic 'Iranian option' (Jalilvand, 2013).

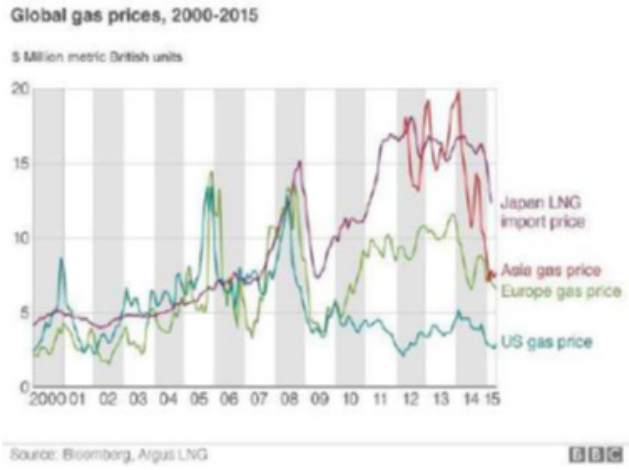

Figure 4. Natural Gas Prices, 2000-2015

Source: Bloomberg, found in Anderson, Richard. "Iran looks to energy reserves for post-sanctions influence, " BBC News July 5, 2015

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Obstacles and Massive Potential

Buy-Back Contracts (BBCs): According to the Iranian constitution, foreign investment in oil discovery was possible only in the form of buy-back service contracts, which still today represent the cornerstone of Iran's Petroleum legal framework. A buy–back service contract is defined as a contract between the NIOC and an international Oil company (IOC), in which the IOC agrees to develop the oil or natural gas field and then hand the field over to the NIOC once production starts.The IOC develops the field and NIOC then repays the costs, including, capital expenditure (capex), operating expenditure (opex), and accrued bank charges. A delay in realization of the contractual production levels affects the maximum payable amount to the IOC. The company fears that its contract will end before it has completed the recovery of its costs, since the amortization cannot continue after the end date of the contract (Hassanzadeh, 2014). Additionally, the IOC receives a pre-agreed remuneration fee, normally, by way of an entitlement to an amount of oil or gas from the development operation. By using a buy-back service contract framework, the NIOC has been able to meet Iran's strict constitutional provisions restricting foreign oil companies, involvement in Iranian oil and natural gas projects, since in the contract the IOC must hand the field back to the NIOC for production. Moreover, this policy has also enabled the NIOC to benefit from the IOC's technical and financial capabilities, since IOC is responsible for developing the field (Tagliapietra, 2014).

Under the buy-back service contract system, IOCs are thus supposed to be paid in oil and natural gas from projects they develop with their own capital but then have to hand back the project to Iranian companies when completed and wait to be paid. The buy-back service contracts are generally considered as highly unattractive by IOCs, which have thus been profoundly discouraged from investing in Iran's oil and gas sector over the last decades. In February 2014, the committee that Zangeneh (Ministry of Energy) assigned for revising the investment regulations introduced a new type of investment contract. The new contract model was named 'Iran Petroleum Contract,' or IPC. According to this committee, IPC offers more desirable terms and incentives by providing investors with higher profits and implementing fees that are in correlation with the investment risks (Vakhshouri, 2015). The IPC proposes a joint venture between an Iranian company and international companies for exploration, development, and production projects (see, Figure 5.)

Sanction: The United Nations, the United States and the European Union tightened sanctions against Iran after the subsidy reform program went into effect, notably U.S. - imposed financial sanctions in December 2011. The new sanctions were at least partially responsible for the spike in inflation and the decline of the trial after 2010(Nikou & Glenn, 2015). The difficulties within the oil and gas sector were aggravated as the U.S and European Union (EU) began to introduce financial sanctions against Iran. However, once the EU began to impose financial sanctions in 2011, it had a seriously negative effect on the Iranian economy, in general and on the oil sector, in particular – it being very difficult to trade oil without access to letters of credit then. At the start of 2012, the EU introduced an embargo against imports of crude oil from Iran. This compounded the impact of the existing embargo imposed by the United States, coupled with the EU's tightening of financial sanctions.Iran has had to offer considerable discounts on crude prices in order to induce consumers to buy the crude. There is, meanwhile, uncertainty as to the technical impact of shutting in wells at the level of Iranian capacity. It seems likely that closing wells does nothing to improve the recovery factor, and that it may actually reduce it significantly, adding to the problems likely to confront the sector in the future (Steven, 2015).

Figure 5. Comparison between the Terms of the IPC

Q3		
Type of contract	Buy-Back	IPC
Durationaof the contract	3-5 years	20-25 years
Fields of involvement	Exploration and Development	Exploration Development& production
Investment returns in exploration projects	If the project doesn't lead to development and production the IOC,S investment will not be reimbursed	If the project doesn't lead to development and production the IOC,S investment will not be reimbursed The IOC,S has priority to participate in another exploration project
fees	Low flexibility	Higher flexibility
Ceiling of profit	Limited	Flexible (higher fees and bonuses in the fields with higher risks)
Cost of operation	Fixed	Open/flexible

Source: Iran's Ministry of Petroleum; SVB Energy International, "Iran

Costs

A few major roadblocks are likely to prevent Iran's oil and gas industry from reaching its full potential anytime soon. One challenge is cost. Iran's oil and gas sector needs between $130 billion and $145 billion in investments by 2020; with current oil prices so low, the price tag may be unpalatable to oil companies. New exports of natural gas would also require expensive new pipeline infrastructure or liquefaction facilities that make it easier to export. Building this

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infrastructure would cost billions of dollars and take years. Even if sanctions are eased, relations between Tehran and Washington will continue to be strained. Some sanctions will remain on Iran because of the government's support for terrorism and human rights abuses. But the country is too big a player to be ignored in a world increasingly hungry for energy resources. It has the longest coast along the Persian Gulf, through which around 40% of the world's oil is transported. Iran demands reconsideration. And it may well get it (Glenn, 2015).

Subsidies and Domestic Over - Consumption

Until very recently, subsidies were one of the most prominent challenges of the Iranian political economy, based on the revolution's theme of social justice and in an attempt to promote economic diversification and industrialization. The Islamic Republic initiated redistribution of income from oil revenues. Natural gas -based food, fuel and electricity were provided for the Iranian people at highly subsidized price for the past several decades. With $80.8 billion or 22.6% of GDP, in 2010 Iran's subsidies were both in absolute and relative terms the largest throughout the Middle East and North Africa (Jalilvand, 2013).

But, as in other countries of the region, subsidies were costly and inefficient. They hampered the performance of the Iranian economy, for example, by discouraging private investment in the energy sector as prices were below production cost. Equally, investments in energy efficient technologies were retarded. Low gas prices, contributed to the lack of incentives to recover around 37 bcm/y, which were flared, vented or lost otherwise in 2011, representing almost 16%of the country's gross production. Iran's level of losses is twice the 8% average of the five largest gross producers (excluding, Iran) (Jalilvand, 2013). Behind the U.S and Russia, Iran is the world's third largest consumer of natural gas with an annual average significantly more of 9.3% in the period from 2000 to 2011; Iranian domestic gas consumption grew significantly more than the average annual GDP (4/1%) and at almost the same rate as production (9.5%).

Legal Barriers

One of the uncertainties for the foreign investors is the legal system in Iran. International law is not enforceable currently in Iran when contrasting with local laws. Similarly, there are no legal grounds for enforcing any verdict or decision of an international court in Iran. The reality of the enforcement of international laws and international courts' decisions in any country is that these laws cannot be used directly as the initial format of the contracts, which is imposed on the contract from the beginning that form the legal behavior of both parties of the contract. It is only after the implementation of the local laws and internal regulations that relevant international laws can be implemented, mostly, if there is a gap in the local laws and regulations. For example, if there is an issue unresolved between a party that is due to the lack of laws or regulations pertaining to that case, the international laws can be used to resolve that particular case (Yeganehskakib, 2015).

Massive Potential

From many respects this part is not clear – please, make it clear - to be a good location for investment and doing business. Some of the features are highlighted below:

Iran accounts for around 1% of the world's population and land, but around 10% of the world's oil reserves and 18% of global gas reserves. With its strong private sector and mature oil and gas industry, the country could be a major player in the global hydrocarbon industry for many years to come. At present, the Iranian oil and gas industry and the private sector companies that provide a variety of services to it, employ over 350,000 skilled Iranians – more than the entire native population of some oil producing states.

A second immediate step that could prove profitable for energy companies is to enter into an agreement with the state oil, gas and petrochemical companies – NIOC, NIGC and NPC, respectively – to improve the latter's existing operations by introducing new technology and the know-how which has been absent from Iran for decades. There are plenty of opportunities which do not require lengthy negotiations with the government and huge capital expenditure. Introducing new equipment and technology to existing production, refining and transportation operations of oil and gas would lead to quick rewards, and, thus, would be the best policy to gain a foothold in Iran's energy industry for further involvement in the future (Nersi, 2015).

Strategic Location: A unique geographical location at the heart of a cross-road connecting the Middle East, Asia and Europe, coupled with many inter - and trans-regional trade, customs, tax and investment arrangements. The Strait of Hormuz, off the southeastern coast of Iran, is an important route for oil exports from Iran and other Persian Gulf countries. At its narrowest point, the Strait of Hormuz is 21 miles wide, yet an estimated 17 million b/d of crude oil and refined products flowed through it in 2013 (roughly, 30% of all seaborne traded oil and almost 20% of total oil produced globally). Liquefied natural gas (LNG) volumes also flow through the Strait of Hormuz. Approximately, 3.7 Tcf of LNG was transported from Qatar via the Strait of Hormuz in 2013, accounting for more than 30% of global LNG trade (EIA, 2015).Market Potentials and Proximity: Vast domestic market with a population of 65 million growing steadily as well as quick access to neighboring markets with approximately300 million inhabitants.

Developed Infrastructure: The territory developed networking in the area of telecommunication, power, water, roads and railways across the country. Political Stability: Representative system of government based on friendly relationship with other nations (Ministry of Economic Affairs, 2015) .

New Investment Legislation: Enactment of the new Foreign Investment Promotion and Protection Act (FIPPA) to

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substitute the former Law Concerning Attraction and Protection of Foreign Investments in Iran (LAPFI) by providing full security and legal protection to foreign investments based on transparency and international standards (Ministry of Economic Affairs, 2015).

Outlook

The Short Term Outlook

In the short term, Iran will likely make use of its natural gas resources to improve the competitiveness of its economy, through a larger share of power generation based on cheap natural gas and through further investments on compressed natural gas (CNG) vehicles, in a move to reduce the domestic consumption, which could thus be freed-up for additional exports (Tagliapitra, 2014).

Pipeline Projects

Iran-Iraq Pipeline: Based on recent progress, natural gas pipeline exports from Iran to Iraq are expected to begin soon. A natural gas pipeline from Iran's Ilam province to the Iran-Iraq border is complete and the construction of the pipeline on the Iraqi side, which will supply the Mansourieh power plant, is near completion. Initial gas exports are expected to start about 50 billion cubic feet (Bcf) per year and increase in the future. Iraq and Iran signed an agreement in the past to supply natural gas to fuel Iraqi power plants in Baghdad and Diyala. The initial contract covered 320 Bcf per year over five years (EIA, 2015).

Iran-Oman Pipeline: In March 2014, Iran and Oman agreed that Iran would export 350 Bcf per year of natural gas via pipeline to Oman. Construction of the pipeline may be delayed because of pricing disagreements. Iran expects gas prices of $11-14/million British thermal units (MMBtu) while Oman is looking to pay $6-8/MMBtu (EIA, 2015).

The Iran-Pakistan export pipeline: is a project gas pipeline, coming from Iran and going to Pakistan. An agreement between Iran and Pakistan was reached in 2009. In 2013, Iran announced that its section of the pipeline was nearly completed, but the Pakistani side of the project had not been completed mainly due to a lack of finance and the pressure, stemming from the sanctions. As of April 2015, some progress from the Pakistani side has been reported, as 'Pakistan is negotiating with the China PetroleumPipeline Bureau, a subsidiary of Chinese energy giant China National Petroleum Corporation, to build 700 kilometers of pipeline from the western Pakistani port of Gwadar to Nawabshah in the southern province of Sindh, where it will connect to Pakistan's existing gas-distribution pipeline network (Saeed, 2015).

The Long Term Outlook

Iran-Pakistan-India Gas Pipeline (IPI): Iran-Pakistan-India (IPI) pipeline project (also called Peace Pipeline) was aimed at constructing a 1,620-mile (2700 km) pipeline from Iran's South Pars fields in the Persian Gulf to Pakistan's major cities of Karachi and Multan and then further to Delhi, India. Because Iran is the most geographically convenient supplier of gas to both countries, Iran is offering to cover 60 percent of the construction costs of the pipeline. The total length of 2700 km project would run 1100 km in Iran and 1000 km to Pakistan and, in case of agreement with India, it will continue 600 km on the Indian Territory. This project is expected to greatly benefit India and Pakistan, which do not have sufficient natural gas to meet their rapidly increasing domestic demand for energy (Gulf oil and Gas, 2015). A land-based pipeline would be four times cheaper than any other option, even after taking into account transit fee payments to Pakistan. Pakistan could earn about $200-$500 million annually in transit fees from the pipeline and would also be able to purchase natural gas from the pipeline. The pipeline can carry 110 million cubic meters of gas a day. 50Mln cm meets domestic needs of Iran and the remaining 60Mln cm will go to Pakistan. Iran will initially transfer 30 million cubic meters of gas per day to Pakistan, but will eventually increase the gas transfer to 60 million cubic meters per day. Now, due to a deteriorated security situation between India and Pakistan, the international sanctions and additional obstacles, such as, pricing, transit fees, and because gas transported through Pakistan would be too expensive for India, the project has not moved forward(Kuhn, 2014, p.244-245).

Iran –India SAGE Subsea Export Pipeline

India is considering building an undersea gas pipeline system to gain access to Middle Eastern gas supplies. South Asian Gas Enterprise (SAGE) has been working on the project, which was originally proposed in the 1990s, for over three years, according to its director, Subodh Kumar Jain. A technical and commercial feasibility report was undertaken by INTECSEA in 2008, which found that the project would be technically feasible. SAGE is reportedly holding talks with Qatar and Iran over the supply of gas for the projects (Kuhn, 2014, p.243).

Gas for the US$3bn project would be sourced from Qatar, Iran and possibly Iraq, and transported to a gas-gathering system on the coast of the Arabian Peninsula from where deep-water gas pipelines would cross the Arabian Sea. The pipelines will reach a maximum depth of 3,500m with a total length of about 1, 000km. The pipelines would each transport 226.5 bcm over a 25-year period, suggesting an annual supply per pipeline of around 9bcm per year, according to media reports, but the number of pipelines planned to be built has not been released. Construction is expected to be completed by 2014, with the pipelines supplying just 0.9Mcm/d or an annualized 320Mcm in the project's first phase (BUSINESS MONITOR, 2010).The same pipeline system could also be used for the transport of natural gas from Qatar to India, thereby creating a nexus of Persian Gulf natural gas suppliers for one of the world's fastest-growing economies. The potential would exist for Turkmenistan to export its gas to India across Iran and via the undersea pipeline, possibly providing New Delhi and Ashgabat an alternative to the long-delayed Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipeline. Should Indo-Iranian cooperation succeed in

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establishing these two projects, the western Indian Ocean could become the central node in an alternative energy and commercial trade corridor to the OBOR, connecting Europe through Iran to India and Southeast Asia (Panda, 2014).

The Iran-Pakistan-China Pipeline: Beijing can potentially import Iranian gas through Pakistan by extending the Iran-Pakistan (IP) pipeline to Xinjiang. The IP pipeline was originally conceived in1995 as the Iran-Pakistan-India (IPI) pipeline until New Delhi's 2009 withdrawal from the project under pressure from Washington. Languishing for twenty years, the IPpipeline was revived by China after the Comprehensive Framework Agreement. On April 20, 2015, Beijing signed an agreement with Islamabad to construct a pipeline from Pakistan's Chinese-built Gwadar port to Nawabshah, where it can join Pakistan's domestic gas distribution network. A boon for energy-starved Pakistan, the IP pipeline will deliver approximately 8.2 bcm annually from South Pars, enough gas to generate 4,500 megawatts of electricity, covering Pakistan's current shortfall in power production (Abidi, 2011).

Iran-EUROP Gas Pipeline: With its 34 trillion cubic meters of natural gas reserves, a level sufficient to satisfy current EU natural gas demand for 90 years, Iran has the highest reserves in the world. Since the election of Hassan Rouhani as president of Iran in 2013, a new political phase has begun. Taking into consideration these new positive developments, many voices in Europe, including, the European Commission (EC), have suggested that Iran could become a major natural gas supplier to the EU. Such a prospect would, theoretically, perfectly fit into the EU's renewed quest for natural gas supply diversification launched in the aftermath of the 2014 Ukraine crisis. However, a closer look at the short- and long-term outlooks of the Iranian natural gas industry provides a less encouraging view about the prospect of Iran becoming a major natural gas supplier to Europe (Tagliapietra & Zachmann, 2015).

Iranian exports to Europe are constrained by not only limited spare natural gas but also by an infrastructure gap. Apart from LNG (which would also mainly target Asian markets due to the demand and pricing dynamics), Iranian natural gas could only reach Europe via Turkey. But this would require a significant expansion of the connections between Iran and Turkey and a new pipeline system to transport natural gas from Turkey to Europe. Iran would have to rely on Turkey for its natural gas supply to Europe. Making this happen would require a strong political and financial commitment from Iran – which for the time being seems to have different priorities. This is somewhat sensible provided the lack of natural gas demand in Europe; with demand back to the 1995 levels and few reasons for expecting a rebound, the European market hardly represents a commercially-attractive option for Iranian natural gas exports (Tagliapietra & Zachmann, 2015).

Results

Expectations

As analysed in the previous section, with successful realisation of some of the gas projects within the time framework provided, Iran may increase its production by a maximum additional 343 MMcm/d. by 2020 and with a maximum additional 543 MMcm/d after 2020.This means that up to 2020, the total production may reach approximately 1000 MMcm/d and after 2023 it may rise up to approximately 1,150 MMcm/d or even more. Figure 6 shows a potential scenario for production growth, where the gross gas production as shrinkage and loss is approximately 9%; the flaring is reduced by 18 MMcm/d (660 mmscf/d) and there is an increase in gas re-injection by a maximum additional 28 MMcm/d (Adibi, 2011).

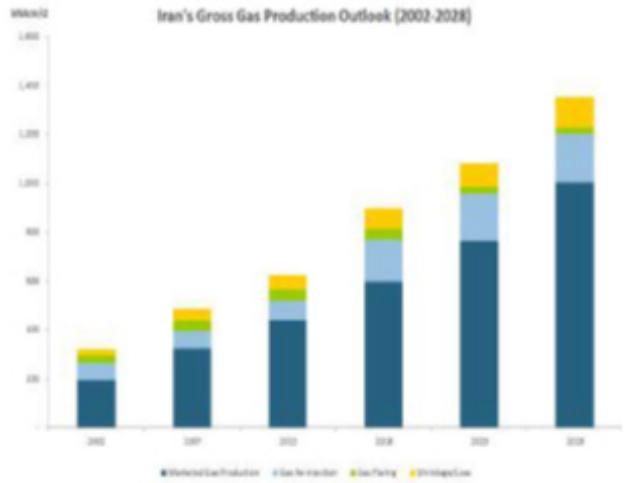

Figure 6. Iran's Gross Production Outlook (2201- 2028)

Source: EUCERS, 2015.

This forecast is based on the assumption that Kish and Lavan field will start to be operational in 2016 and will have reached their full capacity by 2020; and South Pars Phases 12, 15 & 16, and 17 & 18 are fully completed on time (max. by 2017). A less optimistic scenario would assume that the completion of Kish and Lavan fields would be after 2020. Three scenarios for the consumption growth: a high−6% low−4% and base growth rate−4.5% are presented on the figure bellow (see Fig.7).

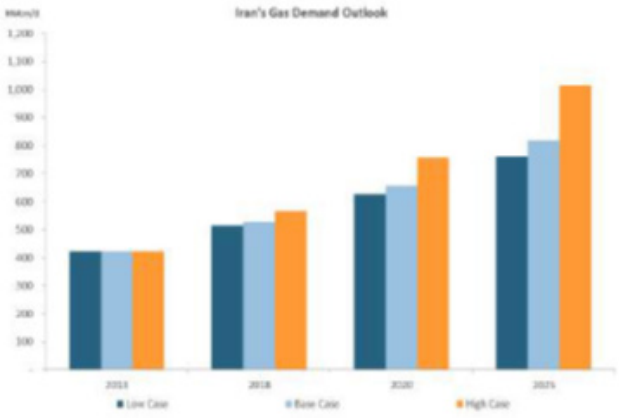

Figure 7. Iran's Gas Demand Outlook

Source: EUCERS, 2015

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Considering the base case scenario of 4.5% growth of consumption, there will be "free" gas capacity of about 70MMcm/d after 2018, more than 100MMcm/d after 2020, and more than 180 MMcm/d after 2025 (see Fig.8). If Iran successfully realises its gas export projects in its neighbourhood (Iraq, Oman, UAE, Kuwait and Pakistan projects) and increases the current exports to Turkey, Armenia and Azerbaijan, Iran will have gas capacity of more than 50 MMcm/d for LNG, only after 2025. If Iran plans to allocate its free gas to LNG projects and increase the capacity of the pipelines that it has in the region, there might not be much spare capacity for exports to Europe. Finally, in case if there is not any decrease in gas demand and domestic consumption continues its growth by an average of 6%, Iran will not be able to export much or any gas. European companies can help Iran to improve energy efficiency, especially, in the power and industrial sectors and to save more gas for exports. In a longer term, this gas can be sold to Europe at a discounted price vs. other export projects to Europe (Vakhshuri, 2015).

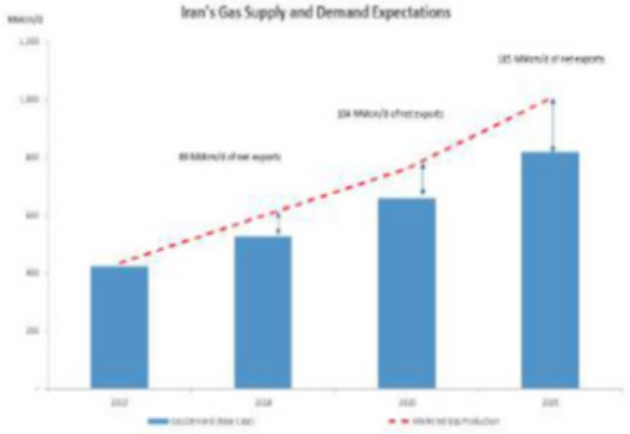

Figure 8. Iran Gas Supply and Demand Expectations

Source: EUCERS, 2015

Conclusion

In order for Iran to increase its natural gas exports the country would need to:

- implement the subsidy-reform,
- increase production and make a greater share of gross production become marketable,
- rationalize its energy and natural gas sector in order to win export contracts from foreign customers, and refrain from using gas contract negotiations as an arena for domestic political struggles.
- replacing more appropriate contracts IOC instead Buyback.

Eventually, the country would need to build confidence internationally that it is serious about exporting natural gas. This refers both to the creation of an export capacity as well as the question of contracts. It seems that the only way this credibility can be achieved is for existing and future export contracts to run smoothly over several years. Iranian gas exports would also benefit from the removal of European and US. Sanctions. Under the sanctions regime, Iran's access to international finance and Western technology is significantly complicated while potential customers find themselves under pressure from Washington and European government. Regardless of external obstacles, it is completely unrealistic to expect that Iran will soon reach a 10% share in global gas trade - 70bcm in 2011 or even export volumes of more than 100 bcm/y. Before the 2030s, it is also highly unlikely for Iran to become a major exporter as defined in this paper - i.e. to export 50 bcm/y or more. Assuming sufficient increase in production and taking into account the contracts signed as well as the state of pipeline development, it appears rather likely that by 2025 Iran could increase her natural gas exports up to a level of perhaps 20-30 bcm/y in the best case.

The lifting of sanctions against Iran will undoubtedly have an enormous impact on the upstream oil and gas market. The location and geographic significance of Iran as well as its low cost base will also play an important part as Iran can easily sell oil and gas to both the European and Asian markets. Iran for provide foreign investors with a safe environment that guarantee their investments and the profit, the issues caused by protectionist laws and the judicial system in favour of internal powerful state-related entities should be resolved. In order to create an environment of confidence for a foreign investor, the law should bestow decision-making power to the second party in this section; otherwise, any failure in the production operations the third party causes may have negative impacts on the second party's fulfilment of its responsibilities.This change would also be beneficial for the first party because after the foreign contractor's approval of the third party, any further failure in production would be foreign contractor's responsibility, and not the result of an imposition of an NIOC subsidiary that the contractor did not want to work with in the first place.

One of the biggest uncertainties for foreign investors is the legal system in Iran. Currently, international law that contrasts with local law is not enforceable. Similarly, there are no legal grounds for enforcing any verdict or decision of an international court. In reality, in all countries international law and decisions cannot be used directly as the initial format of contracts, as the format is imposed on the contract from the beginning and frames the legal behavior of both parties. It is only after the implementation of the local laws and internal regulations that relevant international laws can be applied, generally when there is a gap in the local laws and regulations. For example, if there is an unresolved issue between parties that is due to the lack of domestic laws or regulation pertaining to that case, then international law can be used to resolve that particular case.

Although these new contracts are "service contracts", (Yeganehshakib, 2015) in order to improve them toward pseudo-sharing production contracts, legal obstacles should be removed, particularly, those that forbid foreign ownership of the reservoirs. For example, new laws should protect the safety of investments in the development and

production phases since the investor is also a partial owner of the produced gas or reservoir. The laws should also be revised, so that all the foreign investors and domestic entities, particularly, the IRGC, have all equal rights and responsibilities. Moreover, at the time of public tenders, the Oil Ministry should provide all parties with equal opportunity and treat them equally when assessing the suggested prices in tenders.

Iran is the world's largest combined oil and gas resources, and it seems that the nuclear deal will leave the industry altogether positive effects in the future. However, this effect was not observed in the short term. Iran desperately needs technology and capital for oil and gas sector that would be available from the IOCs.Despite the renewed interest of the super-majors in Iran, the increase in Iranian production will not be immediate as the domestic upstream sector is unlikely to be in any state to start producing cast volumes again at the turn of a tap. Even Iranian officials, who are fairly bullish about the sector, estimate that the oil and gas sector requires investment of between US $130 billion and US $145 billion in the next five years to keep oil production from falling (with, for example, the enor¬mous South Pars gas field requiring up to US $100 billion). Iran has started a subsidiary reform in order to regulate the very low domestic natural gas prices and thus improve consumption efficiency. The development of the South Pars gas field will significantly increase Iran's export potential in the future. In order for Iran to become a large scale exporter of national gas, however, fundamental structural reform would be required on both the international and domestic levels. Iran would need to create an investment environment more attractive to international companies. Though there are advantages to the scheme from the Iranian point of view, buy-back contracts are significantly less efficient than PSAs for rapidly raising output levels. Officials in Tehran will need to make a decision whether their priority is maximum control over the energy sector or fast increases in production. Beyond this, it would also be necessary to stop factional disputes from intervening in the energy sector and particularly in price negotiations.

In the short term, the Iranian natural gas industry will most likely focus on the domestic market, and on limited amounts of regional exports. In this framework, more natural gas might be utilized for reinjection into oil fields in order to sustain growing oil production and exports. In parallel to this, Iran will try to use its natural gas resources to improve the competitiveness of its economy, through a larger share of power generation based on cheap natural gas, and through further investments in natural gas-fuelled vehicles, in a move to reduce the domestic consumption of gas, which could thus be freed-up for additional exports. Meanwhile, the only export projects with the prospect of materialization in the short- to mid-term are regional, namely, those to Iraq, India, Pakistan and, possibly, Oman. Internationally, sanctions relief is, therefore, unlikely to turn Iran into a major natural gas exporter in the short-term. It seems that only in the mid- and long-term, Iran could create an export capacity of several dozen billion cubic meters, which would allow for exports on a substantially bigger scale compared with today

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